

**To:** Lobdell, Danelle[Lobdell.Danelle@epa.gov]  
**From:** Rowland, Jess  
**Sent:** Thur 8/20/2015 1:41:49 PM  
**Subject:** Glyphosate CARC document

Hi Danelle

Here is the outline for the Epi section of the CARC document.

I have put in some text to lead into your assessment.

I am free from 10:30 to 11:00 am. Is this a suitable time for us to discuss...

Thanks

### **III. EPIDEMIOLOGY**

This section includes review of epidemiologic cohort and case-control studies of glyphosate and cancer to evaluate whether exposure to glyphosate is associated casually with risk of developing cancer in humans. This evaluation included seven cohort and eighteen case-control studies.

#### **A. Cohort Studies**

The Agricultural Health Study (AHS) is a large prospective study conducted in Iowa and North Carolina. Participants (private and commercial applicators) were asked to complete a 21-page questionnaire that included data on personally mixing and/or applying pesticides (including glyphosate), and frequency (days of use per year) and duration (years of use) of pesticide use. Data on the use of personal protective equipment, other farming practices, dietary and lifestyle information, demographic data, and medical information were also collected via the questionnaire (Alavanja *et al.*, 1996).

The seven cohort studies are discussed below as “separate” studies; however, they are really separate analyses and publications from the same cohort of the AHS study (Alavanja *et al.*, 2003; Flower *et al.*, 2004; DeRoos *et al.*, 2005; Engel *et al.*, 2005; Lee *et al.*, 2007; Andreotti *et al.*, 2009; and Dennis *et al.*, 2010). It should be noted that there is some overlap between the cases and person-time reported in the AHS. Findings from these studies are presented in Table 1.

## **B. Case-Control Studies**

Of the 18 case-controls studies 14 studies evaluated glyphosate exposure and non-Hodgkins lymphoma (NHL), multiple myeloma and leukemia, three studies evaluated gliomas, and one study on cancer of the stomach and esophagus. There is some overlap among these studies, including pooled analyses.

Three case-control studies conducted by the National Cancer Institute in Iowa and Minnesota during the 1980s were reported by Brown *et al.* (1990), Cantor *et al.* (1992) and Brown *et al.* (1993). DeRoos *et al.*, 2003 reported the results of case-control studies conducted in Iowa and Minnesota, Nebraska and Kansas in the U.S.A. The Canadian population based case-control studies were reported by (McDuffie *et al.*, 2001; Karunanayake *et al.*, 2012 and Kachuri *et al.*, 2013). Results of two Swedish case-control studies were reported by Nordstrom *et al.*, 1998; Hardell and Erikson, 1999 and Hardell *et al.*, 2002), and another Swedish case-control study was reported by Eriksson *et al.*, 2008). A case-control study in France was reported by Orsi *et al.*, 2009. Cocco *et al.*, 2013 reported the results of a pooled analyses of case-control studies conducted in six European countries between 1998-2004. Case-control studies on gliomas were reported by Ruder *et al.* 2004); Carreon *et al.*, 2005) and Lee *et al.*, 2005). Lee *et al.*, 2004 conducted a case-control study of stomach and esophageal cancer in Nebraska. Findings from these studies are presented in Table 2.

## **C. Conclusion**

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